

Multi-Step Equations Using the Distributive Property

Solve each of the following equations showing the proper steps.

Name:

1. $3x + 2(x - 1) = 8$

$$3x + 2x - 2 = 8$$

$$\begin{array}{r} 5x - 2 = 8 \\ + 2 \quad + 2 \end{array}$$

$$\frac{5x}{5} = \frac{10}{5}$$

$$\boxed{x = 2}$$

2. $6 = 3y + 3(y - 6)$

$$6 = 3y + 3y - 18$$

$$\begin{array}{r} 6 = 6y - 18 \\ + 18 \quad + 18 \end{array}$$

$$\frac{24}{6} = \frac{6y}{6}$$

$$\boxed{4 = y}$$

3. $6(2 - r) = -18$

$$\begin{array}{r} 12 - 6r = -18 \\ -12 \quad -12 \end{array}$$

$$\begin{array}{r} -6r = -30 \\ -6 \quad -6 \end{array}$$

$$\boxed{r = 5}$$

4. $8(p + 1) + 3p = -14$

$$8p + 8 + 3p = -14$$

$$\begin{array}{r} 11p + 8 = -14 \\ -8 \quad -8 \end{array}$$

$$\frac{11p}{11} = \frac{-22}{11}$$

$$\boxed{p = -2}$$

5. $3(t - 4) + 6 = 0$

$$3t - 12 + 6 = 0$$

$$\begin{array}{r} 3t - 6 = 0 \\ + 6 \quad + 6 \end{array}$$

$$\frac{3t}{3} = \frac{6}{3}$$

$$\boxed{t = 2}$$

6. $6(x - 4) + 3x = 3$

$$6x - 24 + 3x = 3$$

$$\begin{array}{r} 9x - 24 = 3 \\ + 24 \quad + 24 \end{array}$$

$$\frac{9x}{9} = \frac{27}{9}$$

$$\boxed{x = 3}$$

Two-Step Word Problems

Name:

For each word problem, write a two step equation, using the given variable. Solve showing algebraic steps.

1. At McDonald's, a six-piece Chicken McNuggets and a medium fries have a total of 602 calories. The medium fries have 350 calories. Find the amount of calories in one Chicken McNugget. Let m represent the amount of calories in one McNugget.

$$6m + 350 = 602$$

$$\begin{array}{r} -350 \\ -350 \end{array}$$

$$\frac{6m}{6} = \frac{252}{6}$$

$$m = 42$$

2. Mr. Schmidt is saving money to go to the Daytona 500, a NASCAR race. The trip will cost a total of \$1500. Mr. Schmidt has already saved \$150 and plans to earn the rest of the money tutoring at \$75 per hour. How many hours of tutoring will be needed to pay for the trip? Let h represent the number of tutoring hours to afford the trip.

$$1500 = 75h + 150$$

$$\begin{array}{r} -150 \\ -150 \end{array}$$

$$\frac{1350}{75} = \frac{75h}{75}$$

$$h = 18 \text{ hours}$$

3. You and two friends shared a pizza. You also got a Coke for \$1.75. You paid a total of \$8.40. What was the price of the pizza? Let p represent the cost of the pizza.

$$8.40 = 1.75 + 2p$$

$$\begin{array}{r} -1.75 \\ -1.75 \end{array}$$

$$\frac{6.65}{2} = \frac{2p}{2}$$

$$p = \$3.33$$

4. A long distance phone call is made using 10-10-220. They charge \$0.99 for the first 20 minutes, and \$0.07 for each additional minute. A long distance phone call, using 10-10-220, costs a total of \$2.81. Find the total number of minutes used to make this long distance phone call. Let a represent the number of additional minutes used.

$$2.81 = .99 + .07a$$

$$\begin{array}{r} -.99 \\ -.99 \end{array}$$

$$\frac{1.82}{.07} = \frac{.07a}{.07}$$

$$26 \text{ minutes} = a$$

5. You and four friends go out to eat dinner and split the bill evenly. Your friends ditch you leaving you to pay the tip, \$6. You end up spending a total of \$14, the cost of your portion of the bill and the entire tip. What was the cost of the dinner? Let d represent the cost of the dinner.

6. Mr. Schmidt's car has a 15.8 gallon gas tank. He pulls into the station with 2.6 gallons left in the tank. If the gas pump pumps 2.2 gallons per minute, how long will it take to fill the tank. Let m represent the number of minutes to fill the gas tank.

$$15.8 = 2.2m + 2.6$$

$$\begin{array}{r} -2.6 \\ -2.6 \end{array}$$

$$\frac{13.2}{2.2} = \frac{2.2m}{2.2}$$

$$6 \text{ minutes}$$

Word problems with variables on both sides

Name:

For each word problem, write an algebraic equation using the given variable. Solve showing algebraic steps.

1. Container A and container B have leaks. Container A has 800 ml of water, and is leaking 6 ml per minute. Container B has 1000 ml, and is leaking 10 ml per minute. How many minutes, m , will it take for the two containers to have the same amount of water?

$$\begin{array}{r} 800 - 6m = 1000 - 10m \\ -800 \quad -800 \end{array}$$

$$\begin{array}{r} -6m = 200 - 10m \\ +10m \end{array}$$

$$4m = 200$$

$$m = 50$$

50 minutes

2. Tim is choosing between two cell phone plans that offer the same amount of free minutes. Cingular's plan charges \$39.99 per month with additional minutes costing \$0.45. Verizon's plan costs \$44.99 with additional minutes at \$0.40. How many additional minutes, a , will it take for the two plans to cost the same?

$$\begin{array}{r} 39.99 + .45a = 44.99 + .40a \\ -39.99 \quad -39.99 \end{array}$$

$$\begin{array}{r} .05a = 5 \\ .05 \quad .05 \end{array}$$

$$a = 100$$

100 minutes

3. The cost to purchase a song from iTunes is \$0.99 per song. To purchase a song from Napster, you must be a member. The Napster membership fee is \$10. In addition, each purchased song costs \$0.89. How many downloaded songs, d , must be purchased for the monthly price of Napster to be the same as iTunes?

$$\begin{array}{r} .99d = 10 + .89d \\ -.89d \quad -.89d \end{array}$$

$$\begin{array}{r} .10d = 10 \\ .10 \quad .10 \end{array}$$

$$d = 100$$

100 songs

4. Container A has 200 L of water, and is being filled at a rate of 6 liters per minute. Container B has 500 L of water, and is being drained at 6 liters per minute. How many minutes, m , will it take for the two containers to have the same amount of water?

$$\begin{array}{r} 200 + 6m = 500 - 6m \\ -200 \quad -200 \end{array}$$

$$\begin{array}{r} 6m = 300 - 6m \\ +6m \quad +6m \end{array}$$

$$\begin{array}{r} 12m = 300 \\ 12 \quad 12 \end{array}$$

$$m = 25$$

25 minutes

5. UPS charges \$7 for the first pound, and \$0.20 for each additional pound. FedEx charges \$5 for the first pound and \$0.30 for each additional pound. How many pounds, p , will it take for UPS and FedEx to cost the same?

$$\begin{array}{r} 7 + .20p = 5 + .30p \\ -.20p \quad -.20p \end{array}$$

$$\begin{array}{r} 7 = 5 + .10p \\ -5 \quad -5 \end{array}$$

$$\begin{array}{r} 2 = .10p \\ .10 \quad .10 \end{array}$$

$$20 = p$$

20 pounds

6. A twelve inch candle and an 18 inch candle are lit at 6pm. The 12-in. candle burns 0.5 inches every hour. The 18 inch candle burns two inches every hour. At what time will the two candles be the same height? Let h represent the number of hours.

$$\begin{array}{r} 12 + .5h = 18 + 2h \\ -12 \quad -12 \end{array}$$

$$\begin{array}{r} .5h = 6 + 2h \\ -.2h \quad -.2h \end{array}$$

$$\begin{array}{r} -.5h = 6 \\ -1.5 \quad -1.5 \end{array}$$

$$h = -1.2$$

14:40pm

Multi-Step Word Problems

Name:

1. For the 2004-2005 Los Angeles Clippers' basketball season, Corey Maggette's salary was \$3 million more than Quentin Richardson. Elton Brand made double Corey Maggette's salary. Altogether their salaries totaled \$21 million. What are each of their salaries?

a. Who makes more, Maggette or Richardson? How much more?

b. Who makes more, Brand or Maggette? How much more?

c. Who makes more Brand or Richardson?

d. How much do they all make, total?

e. Use q to represent Quentin Richardson's salary.

f. Write an algebraic expression for Maggette's salary, using q for Richardson.

$$q + 3$$

g. Write an algebraic expression for Brand's salary using q for Richardson.

$$2(q + 3)$$

h. Write and simplify an algebraic expression for their total salaries.

$$q + q + 3 + 2(q + 3)$$

i. Write an algebraic equation that relates the three players to their total salary, using q . Solve.

$$21 = q + q + 3 + 2(q + 3)$$

$$21 = q + q + 3 + 2q + 6$$

$$21 = 4q + 9$$

$$12 = 4q \quad q = 4$$

j. Determine each player's salary.

Richardson = \$4 mill

Brand = \$14 mill

Maggettes = \$7 mill

2. Ed, Ted, and Fred are ordering some pizzas. Ed has twice as much as Fred. Ted has \$6 less than Ed. Together they have \$39. How much does each have?

a. Let f represent Fred's money.

b. Write an algebraic expression for Ed, using f .

$$2f$$

c. Write an algebraic expression for Ted, using f .

$$2f - 6$$

d. Write and simplify an algebraic expression for their total amount of money, using f .

$$f + 2f + 2f - 6$$

e. Write an algebraic equation that relates their money to the total. Solve.

$$39 = f + 2f + 2f - 6$$

$$39 = 5f - 6$$

$$45 = 5f$$

$$9 = f$$

f. Determine each person's amount of money.

$$\text{Fred} = \$9$$

$$\text{Ed} = \$18$$

$$\text{Ted} = \$12$$